

1 of the product that you're asking for, the real issue was
2 more of how to get the process down. That was really the
3 issue at hand.

4 Q Is this the process of manufacturing the tube?

5 A Correct.

6 Q For the time that you were at Hardcore DuPont, was
7 the tube also manufactured by way of the VARTM process you
8 had been describing?

9 A Yeah. Just for clarification, the tube was
10 manufactured by the VARTM process for the entire existence.
11 It was never manufactured any other way.

12 Q So up until 2004 or up until 2005?

13 A Yeah. How it was done has evolved. But the VARTM
14 process was used the entire time.

15 Q Can you give me some idea of some of the changes
16 that occurred in terms of the manufacturing process?

17 A The biggest change was really when we went -- I
18 mean the biggest most key change was going from having the
19 resin put in around the outside of the tube. This gets kind
20 of complicated. To the resin being put on the inside of the
21 tube and a vacuum being pulled from the outside of the tube.
22 Initially it was vacuum being applied at one end and the
23 resin kind of being sucked through the length of the tube or
24 being put in, the vacuum being put in around like two parts
25 of the tube and the resin being put around the tube, to

1 opposing sides of the tube and trying to get it. But all
2 doing it outside, called the outer surface of the tube.

3 Q And you're saying that's a major change in terms
4 of the process of manufacturing the tube?

5 A Correct.

6 Q Let's move on, then, to the idea of inserting
7 material into the hollow portion of the tube. And, as I
8 understand it, that wasn't actually being done by Hardcore
9 DuPont when you got there in '97 and the sale by Hardcore
10 DuPont of a product with concrete or some other material in
11 the tube?

12 A Yeah. Tubes were just tubes. Shipped. Their
13 ultimate use may have been for piling but they were being
14 manufactured and shipped hollow.

15 Q At some point during your tenure at Hardcore
16 DuPont, did Hardcore DuPont start manufacturing or offering
17 a product with some type of filler material inside the tube?

18 A I believe we offered it as an option to the
19 contractors to prefill them for them. But it wasn't
20 something that anybody wanted to do.

21 Q Anybody meaning --

22 A Anybody at Hardcore wanted to do.

23 Q Why is that?

24 A It was an economically losing proposition.

25 Q As I understand it, then, you, Hardcore DuPont,

1 was aware of the fact that after you would sell this tubing
2 to the end user, that sometimes on site they would pour
3 something such as concrete into the tubing?

4 A They would, you know, pour concrete, they would
5 pour sand, they would pour a number -- there is a number of
6 different things they could put into the tube. A lot of
7 times they would just drive it hollow and leave it hollow
8 or, as I said, top the top off because they had to attach it
9 to something.

10 Q During your time at Hardcore DuPont, were you out
11 in the field in any way providing guidance, assistance,
12 whatever, to an end user?

13 A Now, we are still talking about that one year time
14 frame, correct?

15 Q Okay. Let's start with that. Let's talk for that
16 one year term. Were you out there in the field assisting
17 end users with putting material into the tube?

18 A No. The idea of putting, filling a tube, a piling
19 up with concrete, whether it was composite, steel, aluminum,
20 whatever, concrete, they make concrete, tubular concrete
21 piles. The idea of piling them with concrete at the job
22 site was something that was being done for a hundred years.
23 It's not some new thing that was only in composite pilings.

24 Q I appreciate that. But the fact that Hardcore
25 DuPont was putting out there a composite tube, was there

1 anything unique about the composite tube that end users had
2 to be concerned about before they put filler material in?

3 A Nope.

4 Q And back then, to the question, were you
5 providing, you, Hardcore DuPont, providing any type of
6 assistance or guidance of what type of material to put in or
7 how to put it in or what to do before you put it in?

8 A The only thing we did for them is one of the
9 things that the engineering community desires is to know
10 what the capacities of the -- call it the final product of
11 tube and concrete together can give you. Because the
12 reason, to clarify, the reason you would put concrete or
13 sand or foam or God knows what you would throw into a tube,
14 the reason you're putting that in there is to, as I
15 described earlier, the stepping on the soda can and hitting
16 it with your finger. That's what's known in engineering,
17 that's the first mode of buckling.

18 There is three modes of buckling. The first
19 mode of buckling is what I'm describing there, which is
20 when it's being loaded from both ends and the stresses
21 are building up and then something from the side, it
22 starts to bend and then the material, the material that
23 the shell, tubular shell, whatever it is, is made out
24 of, can't take anymore and wants to collapse inward and
25 it compresses on that one side. The other side is going

1 into tension. Nothing happens to it.

2 The reason you fill a piling, whether it's
3 composite steel or whatever with concrete or sand or
4 some filler, is to reduce that, when it wants to go, so
5 when you like say dink it with your finger, if you can
6 picture if you're standing on that soda can and it was
7 filled up with sand, you can dink it with your finger
8 and it is not going to start to collapse until the sand
9 or concrete or something exceeds its ability to resist
10 you hitting it with your finger. So that's the reason
11 you fill a tube up with --

12 Q So in your terminology, that reduces the
13 likelihood or --

14 A It reduces.

15 Q Reduces the first mode of buckling?

16 A Correct.

17 Q And the concept of putting material into a tube to
18 reduce that first mode of buckling is an idea that existed
19 for a hundred years?

20 A Yeah. The reason you do that, there is the other
21 way to reduce that first mode of buckling would be to make
22 the wall thickness of your tube thicker. Well, if you're
23 using steel, concrete, composite, whatever you're doing,
24 typically the material your tube is made out of is
25 extremely -- is much more expensive than what you can throw

1 into the inside of it.

2 So basically what you're doing in using it as a
3 piling scenario is making the tube strong enough to be
4 able to be driven out without anything in the center of
5 it and then just filling it up with something cheap.
6 You know, the columns in your basement at home, the
7 steel column in your basement, everybody has got one,
8 that's a very thin steel tube filled with concrete.

9 Q Going back to the question that I was headed for
10 was whether you, the company, was providing any assistance
11 to contractors. I think you were about to tell me what you
12 were doing was testing the properties of this tube?

13 A Yeah. What they were -- what they cared about --
14 sorry.

15 Q We may communicate from time to time. You can
16 ignore that. Go ahead.

17 A What they cared about was they wanted to know
18 ultimately, if it got filled up with some material, what was
19 the ultimate capacity of the tube. They really didn't care
20 what the tube's capacity was unfilled. I mean some did.
21 But they want to know, you know, how much capacity can they
22 get out of one of these tubes if you fill it with something.

23 And so the assistance, in trying to answer your
24 question, the assistance that they are asking for wasn't
25 in the field, it was pre field. If we fill it with

1 this, what are we going to get.

2 Q Were you involved at all in any of the testing,
3 that sort of testing?

4 A I mean -- yes, I was involved in it.

5 Q Overseeing it?

6 A Overseeing it, defining it, deciding what tests
7 should be run. That sort of thing.

8 Q Now, at some point, was there, just either at
9 Hardcore DuPont or one of the later iterations of that
10 company, that the idea of putting the concrete or putting
11 some material in the tube and then selling that as the
12 product to the end user became a little bit more
13 economically feasible or something that the company wanted
14 to explore?

15 A No. Actually, it was really economically not --
16 it was something we didn't want to do. We didn't want to
17 explore. You know, the idea of -- one of the selling
18 virtues of the Hardcore tube is that it's hollow, strong,
19 it's light. You can drive it hollow, which any of our, you
20 know, there is a number of other people, players in the
21 composite tube pile industry, whose piles couldn't be driven
22 hollow because they weren't being made.

23 If you segue back to when I described how the
24 tube was made and the fact that it's got mostly
25 longitudinal fibers in it, it could take a pile driver,

1 like driving the pile without the concrete in it.

2 So there is a lot of advantages. The
3 contractors saw a lot of advantages to that. Because
4 now they had tube that they could pick up with, you
5 know, a backhoe or some small piece of equipment and
6 move it around the job site, throw it into their pile
7 driving rig and drive it and then fill it later. As
8 opposed to you can picture how much a tube filled with,
9 especially in the bigger diameters, filled with concrete
10 weighs and how hard it would be to move around and
11 handle.

12 And so that same reasoning is why we did not
13 want to be filling these things at the facility.
14 Because now all of a sudden you had tubes that were
15 filled, if you had tubes that were filled with concrete
16 that now went from weighing, you know, a thousand pounds
17 to 10,000 pounds. And, you know, just from the handling
18 and the facility part of things, not let alone now we
19 had -- you would have to truck these to the job site.
20 This truck can only hold 40,000 pounds. If your tube
21 weighs 8,000 to 10,000 pounds, you're only getting four
22 of them on a truck and the truck driver is charging you
23 the same price to drive four of them as he does 30 of
24 them.

25 Q Well, notwithstanding the fact that you weren't

1 excited or saw it as not very economical for you, did at
2 some point one of the iterations of Hardcore start offering
3 that as a product?

4 A I think I have already answered that question. He
5 said that, you know, if somebody wanted them filled, we
6 would fight strongly. But we would sometimes fill them for
7 a fee.

8 Q Now, just so we are clear. Did that change at all
9 at any time from '97 when we are talking about Hardcore
10 DuPont through the various iterations up to Hardcore
11 Composites, LLC, the fact that you would only fill them on
12 rare occasions when a customer demanded it?

13 A Correct. Just so we are all clear, that that --
14 from the beginning to the demise of Hardcore, that was
15 exactly when we would strongly try to not fill them and get
16 them to fill them themselves. And I think on maybe three,
17 four occasions at the most, I think we prefilled them. And
18 in those cases, we actually filled them in specific
19 methodology.

20 Q Mr. Green is here. Why don't we take a short
21 break.

22 (A brief recess was taken.)

23 BY MR. WERNER:

24 Q Right before we took a break here, I understood
25 you to say that there were approximately three or four

1 instances in which Hardcore in one of its iterations
2 actually filled the tubes before sending it off to an end
3 user, is that correct?

4 A Correct.

5 Q In those three or four instances, was the filler
6 material concrete?

7 A Yes, it was.

8 Q Now, had you, that is Hardcore, done any type of
9 testing or made any sorts of decisions as to what the mix of
10 the concrete would be? Anything unique or special about the
11 concrete that it was pouring into the tube?

12 A Other than its ultimate compressor strength, there
13 was nothing special about it.

14 Q Did Hardcore do anything to the tubes themselves
15 to prepare them or in any way do anything to the preparation
16 of the interior of the tube before putting the filler
17 material and the concrete in?

18 A No. We are back to Hardcore now from its
19 existence?

20 Q Yeah.

21 A Or are we just discussing the whole span?

22 Q The whole span. Because I'm not sure when these
23 three or four instances actually occurred.

24 A Yeah. Because you were focusing on the Hardcore
25 DuPont composite time. Then you were jumping around. So I

1 just want to make sure that we are --

2 Q Yeah. I'll clarify it for the record.

3 As I understand it, during the entire existence of
4 Hardcore from your connection with it, '97 until the end,
5 '04, '05, there were only three or four instances in which
6 Hardcore actually filled a hollow tube with concrete?

7 A Correct.

8 Q Before setting it? Okay.

9 Can you tell me what version of Hardcore it was,
10 whether it was Hardcore Composites, LLC, or one of the other
11 ones?

12 A I mean as best I can -- I'm trying to figure out,
13 remember without having everything in front of me.

14 I'm thinking that most of the times that it got
15 filled, it was -- not DuPont, it was the Hardcore Composites
16 LLC. I can't remember exactly what was going on with that
17 material.

18 Q Can you remember the name of any of these three or
19 four projects?

20 A There was the sewer outfall project in Long
21 Branch, New Jersey. And then I believe there was one for a
22 marina in New Jersey. I can't think of the name of it now.

23 And then in -- what else did we do? I'm not quite
24 sure of the other ones.

25 Q For the Long Branch, New Jersey?

1 A Yeah.

2 Q Do you remember anything about the diameter of the
3 tube?

4 A Well, those were 18 inch diameter tubes and they
5 were also unique in that they had a jet tube installed in
6 them. So basically the concrete was actually an annulus of
7 concrete as opposed to a completely solid. And I believe
8 the tubes that went to one of the jobs in New Jersey was the
9 same way. So they weren't actually completely filled with
10 concrete.

11 Q Do you remember anything about the compressor
12 strength of the concrete?

13 A Most of the time, it was I think we tried to stick
14 it in a 5,000 p.s.i. range.

15 Q In constructing the tube itself, did you do
16 anything to the interior of the tube to assist the
17 connection between the concrete or whatever the filler
18 material might be in the inner wall of the tube?

19 A Not purposely. But if you go back to the way -- a
20 while ago you asked the question about what was one of the
21 things that I was focused on doing in making the process
22 more robust was the way that we infused the tube. We went
23 from diffusing around the outside of the tube, putting a
24 resin in around the outside of the tube and pulling a vacuum
25 on the outside of the tube to putting a resin on the inside

1 of the tube and pulling the vacuum, pulling it through and
2 out. And in doing that, because the bladder -- we used a
3 bladder as the inner mold. If you just put the fiberglass
4 up against the bladder, when you inflated the bladder and
5 you pulled vacuum on it, it would compact it so hard that
6 nothing would move. The fluid, the resin, wouldn't move
7 through it. It was squished so hard.

8 So what you end up having to do is put some
9 sort of material in there to act as a little spacer to
10 let the resin have a path to move through the -- down
11 between the bladder and the fabric before it comes out.
12 And so that material that we used is kind of a generic
13 industry term called a distribution media, which is
14 basically -- comes in a number of different variations.

15 But effectively, if you can picture a piece of
16 like window screen looking stuff where it's woven over
17 top of itself. It's like an open mesh.

18 And what happens is with the mesh going back
19 and forth, it leaves spaces for the resin to flow
20 through.

21 Well, it's called the side effect of using --
22 of switching to that one, it made the process a lot more
23 robust and the tube to get fully saturated with resin.

24 The side -- what's called the side effect is
25 that you were left with a grid pattern on the inside of

1 the tube.

2 Q This distribution media, you were describing that
3 for me. Is that some sort of material or fabric itself? Is
4 that a window screen like material?

5 A I was trying to describe it. A number of
6 different things can be used. The distribution media is
7 just the generic term.

8 Q Okay.

9 A Basically it's some sort of a mesh that has --
10 like has a profile to it. So if you lay it flat and you're
11 looking, even though it's maybe thin, it's kind of woven.
12 Like if you can picture what a window screen looks like when
13 it's going up and over itself. And you can picture that if
14 you have like two pieces of glass and you put one piece of
15 window screen between them, there is going to be a gap left
16 in between the where the window screens are going up, where
17 the little wires are going up and down.

18 So what happens is we used that gap to allow
19 the resin to travel through in between the fabric and
20 the bladder. As I said, the side effect was that when
21 you deflate the bladder, you're left with a series of
22 ridges.

23 Q Whatever this distribution media was, would that
24 somehow then become part of the tubing because of this
25 process?

1 A Yeah. It ended up getting squished and locked
2 into the tube. But what you were left with was a grid-like
3 surface on the inside.

4 Q The distribution media, if we looked at it before
5 you insert it, was it colored at all?

6 A Most of the distribution we used was red in color.
7 It was basically the same mesh that you when you go and buy
8 a bag of onions, you know the red bag that the onions come
9 in? Well, it was the same material. It was a big giant
10 roll that they hadn't turned it into an onion bag yet.

11 Q And this, as you talked about the grid-like
12 surface that on the interior, one of the byproducts of that
13 was that it increased the connection between the concrete
14 that was being poured inside and the connection to the
15 interior of the tube?

16 A No, you just said that. My last statement was
17 that it left a grid-like surface. And sometimes also
18 because it's kind of flexy, it's like an onion bag, you
19 know, that's all soft and kind of pliable. It would get
20 little wrinkles in and stuff. Beside the grid, you would
21 get little ridges running along. Like randomly.

22 Q Was one of the effects of that, then, to increase
23 the connection between the concrete and the interior of the
24 tube?

25 A Yeah. One of the side -- the beneficial side

1 effects, besides making it, like the downside of it was that
2 the tube wasn't very good for using it as a pipe. Because
3 it was too rough on the inside.

4 The upside was that because it was rough on the
5 inside, if you filled it with concrete, you couldn't
6 push the concrete out of it because it was effectively
7 locked in there.

8 Q We'll start talking about some documents now.

9 (Hemphill Deposition Exhibit No. 1 was marked for
10 identification.)

11 BY MR. WERNER:

12 Q I have shown you a document that I have had marked
13 as Deposition Exhibit No. 1, and ask you just to familiarize
14 yourself generally with it. Have you had a chance to do
15 that?

16 A Yeah, I'm familiar with it.

17 Q Can you tell me what it is?

18 A This appears to be the, as it says, Composite
19 Tubular Piling Specification guide that was done sometime
20 after 2000.

21 Q If you look at the last page of the document,
22 there is a date down at the bottom, revised September 2000.
23 Do you see that?

24 A Yeah.

25 Q Does that help you at all in terms of dating the

1 preparation of the document?

2 A No. That's what I'm telling you, it's sometime
3 September 2000 or after.

4 Q Is there some other key?

5 A No. I'm just using it based on the date that is
6 on the back and then it has the 618 Lambsons Lane address.

7 Q What was the purpose of this document or how was
8 the document used?

9 A It was used to assist engineers in designing with
10 the composite pilings.

11 Q Now, if the 2000 date is correct, that would be
12 shortly after Hardcore Composites, LLC, was a self-standing
13 or free-standing company shortly after the split from the
14 series of parents?

15 A Correct.

16 Q The description of the pilings, tubular pilings,
17 contained within this document, would that be accurate for
18 the tubular pilings that were being offered for sale by
19 Hardcore during its entire existence from 2000 up until the
20 end of '04, early '05?

21 A Pretty much. Other than the acrylic skin. We
22 went from having an acrylic outside to just using acrylic-
23 based paint.

24 Q If I could direct your attention to the third
25 page. In the second full paragraph, it talks about testing

1 of the standard tubular pilings performed at Lehigh
2 University.

3 Do you know when that testing was performed?

4 A I believe that series of tests was -- I want to
5 say that that was I think in like the '98 time frame. It
6 was late nineties. Again, I can't exactly tell you. I
7 think '98, '99. Something like that.

8 Q If you go a few pages in, say two pages beyond
9 that, Applications and Use of Tubular Composite Piling. Do
10 you see that heading?

11 A Um-hmm.

12 Q Under the paragraph, Mooring Applications, the
13 second paragraph, the document talks about a single piling
14 dolphin or as a piling cluster.

15 Earlier we were talking about pilings and we used
16 the phrase whaler.

17 What is a dolphin or piling cluster and how does
18 that fit in with the terminology you earlier gave me,
19 whaler?

20 A Well --

21 Q And fender, I'm sorry, was the other phraseology
22 you used.

23 A Well, a couple things.

24 The capacity of a single pile, you have a single
25 pile, drive it in the ground or out in the ocean if you're

1 using it for a mooring, it's got a certain ability when you
2 push against it to take a certain load. Obviously if you
3 keep increasing the diameter of the pile you're using, the
4 capacity keeps going up and up and up but to a certain point
5 the price of those piles also gets bigger and bigger and it
6 costs more to put in and a number of things.

7 They'll also at times take and make what's called
8 a cluster, take a cluster of them, meaning they'll drive a
9 number of smaller diameter piles, put one in the center and
10 start driving pilings around it. If you can picture
11 grabbing a bunch of pencils and holding them together, you
12 got a whole bunch of them all together, and they'll take
13 them and drive them all next to each other like that and
14 band them or bolt them all together. And that's what they
15 would call a cluster.

16 So they try to get some extra capacity by using
17 them in that sense. So that's the difference between a
18 single one and a cluster.

19 You're asking about the whalers. The whalers
20 are horizontal elements where they would take a number
21 of pilings and say drive pilings in eight, ten feet
22 apart from each other in a line and then either use
23 timbers or another pile or something and mount them
24 horizontally to the piles that are driven vertically so
25 that when a ship or something comes in, it can hit

1 anywhere along there and catch and distribute the load
2 to the individual piles.

3 And a fender panel is just a big, square panel
4 made out of some material, wood, timber, steel,
5 composite, it doesn't really matter, that they are using
6 to increase the area that a docking ship has to transfer
7 the load to the single pile.

8 Q And one other term, dolphin, you used here?

9 A Again, a dolphin is kind of a -- like a back and
10 forth switch name for cluster.

11 Q Whatever we are talking about here, whether it's a
12 cluster, the whaler, the fender panel, there are pilings
13 that would run vertical?

14 A Correct.

15 Q And the pilings that are running vertical are the
16 composite tubes that we have been talking about?

17 A I mean given that they use composites to make it,
18 correct.

19 Q If I could have you move a couple more pages back
20 to the Project Profile. There is reference to a Delaware
21 River and Bay Authority Project. Do you see that?

22 A Um-hmm.

23 Q Was there any concrete filled composite tubing in
24 that project?

25 A In that project, the pier end was replaced with

1 big stay-in-place forms. You can't tell by this thing. It
2 was complicated. I think there was some 40 some piles, 44
3 piles, 18-inch piles, driven even hollow inside this
4 stay-in-place form. And then they topped them off with
5 concrete.

6 Q They being the end user or the contractor as
7 opposed to Hardcore Composites?

8 A Correct. They actually just filled from basically
9 the mud up to lock the -- the big top thing was locked into
10 the top of the piles.

11 Q Let's go to the last page. Table 6, Driving
12 History.

13 A Okay.

14 Q There is a first column, left side, Project, and
15 then several projects identified. Are they all projects for
16 which Hardcore Composites supplied composite tubing?

17 A Yeah. Correct.

18 Q Did any of these projects involve composite tubing
19 filled with concrete by Hardcore Composites?

20 A Down at the bottom where it says, Asbury Park,
21 Long Branch --

22 Q Yes.

23 A That's on the same job. It's just two different
24 sections of the beach. I think I already discussed that
25 with you before. And that's, as far as I know, that's on

1 that.

2 Q Okay.

3 Now, who was the intended audience for this
4 document?

5 A The customer.

6 Q Was this document still in use as of '04 when
7 operations ceased or was there a later version of this
8 document?

9 A I believe there was a later updated, slicker
10 version. Let's say more commercially produced version of
11 this document. This is something we did.

12 Q Would it be fair to say, though, that the
13 substantive information of the slicker versions of this
14 would have been the same?

15 A Yeah. For practical purposes, the substantive
16 information in anything from here on is the same.

17 MR. WERNER: Mark that as 2.

18 (Hemphill Deposition Exhibit No. 2 was marked
19 for identification.)

20 BY MR. WERNER:

21 Q If you take a look at a document I have had marked
22 as Deposition Exhibit 2. And when you generally familiarize
23 yourself with it, you can let me know. Okay?

24 A Yeah.

25 Q Can you describe that document for me, please?

1 A I believe this is a document that was generated
2 for -- I can't even tell you what project that has to be --
3 that we were competing for. So we had to have our own set
4 of specifications that met the standard specifications in
5 the industry. When you bid a project, you have to submit
6 the specs. So when you notice, it goes through and has like
7 a description of materials and there is this whole series or
8 method of payment, method of measurement. So I can't even
9 tell you what this was for.

10 Q Sitting here today, you cannot recall what project
11 this was for?

12 A Yeah, I can't. But I know that at times we had
13 to -- and we, anybody that when you have product and there
14 is say a job out there that somebody is already specified on
15 the job and you want to be considered an approved equal, you
16 have to submit a set of specifications. That's in line with
17 a certain format that this represents.

18 Q So this document was prepared project specific,
19 correct?

20 A That would be my --

21 Q Although the document itself was prepared project
22 specific, was there anything different about the
23 specifications that you were offering in this document,
24 different than the normal product being offered by Hardcore
25 at the time?

1 A Can you -- I think you need to clarify that
2 question a little bit for me.

3 Q Fair enough.

4 As we go through this specification data, there is
5 various information about the Hardcore Composite product,
6 correct?

7 A Correct.

8 Q And I understand that this document was formatted
9 to meet whatever specifications or requirements were for the
10 specific project that you were looking at at the time?

11 A Right. Which I can't recall.

12 Q Understood. My question is, was there anything
13 that you had to change about your product or something you
14 had to enhance or do differently about your product so that
15 you could prepare this set of specifications and meet the
16 specifications that were required by this project?

17 A Well, I think you need to make sure that you're
18 clarifying two separate things. You have our product, which
19 was a composite tube and how the end user, which is an
20 engineer, which is why it is being specified what the
21 engineer was requiring on his final use of that tube.

22 Q Can you point some of those things out for me?

23 A Excuse me?

24 Q Can you point some of those out for me?

25 A Probably the most glaring one would be the fact

1 that this, on this particular job, they would want to put,
2 in the concrete fill that the contractor is going to, you
3 know, end up using on the project, they are going to want to
4 put a non shrink add mixture in.

5 Q And is that different than what Hardcore did in
6 the two or three instances that it offered a concrete fill
7 tube?

8 A There was no need because the inside surface of
9 our tube is so rough. There is no need to add any shrink,
10 add mixture to the concrete. Because the reason you're
11 going to add any shrink mixture is to keep it in contact
12 with the outside of the tube. At least in this case. There
13 is not a lot of reasons why they would add an anti-shrink
14 mixture to concrete depending on the application. But in
15 this case, they obviously want to keep the concrete in
16 contact with the outside of the tube.

17 Q And the engineer on this project was requiring
18 that non shrink add mixture be utilized and, as part of the
19 specification that you were offering, Hardcore was prepared
20 to do that; is that what you're telling me?

21 A No. This specification, the job required
22 obviously that the concrete that's placed in the tube have
23 non shrink add mixture in it. I can't even tell you what
24 project this was for.

25 Q Sitting here today, do you have a recollection of

1 whether or not Hardcore actually got the bid for this
2 project?

3 A Well, I can tell you, sitting here today, that I
4 never put anti shrink add mixture in any concrete in the
5 tubes that we did fill. How's that? Does that clarify some
6 things?

7 Q This document, although project specific, was this
8 in any way incorporated into Hardcore's general advertising
9 program?

10 A All I can probably say to that is that once, you
11 know, unfortunately, once these things are like in the
12 computer and, you know, people, salespeople or somebody,
13 they are available and being handed to somebody. So whether
14 it was part of our specific program or not, I can't comment
15 on that.

16 Q But it may well be that some people use this or
17 pass this out in terms of trying to market Hardcore's
18 products?

19 A Right. Again, other than that one section, you
20 know, it succinctly describes our product.

21 Q If you would look at the top of page two, the
22 letter C, the FRP composite tubes shall be manufactured with
23 a textured, inner surface. Do you see that?

24 A Correct.

25 Q Is that the inner surface you were describing for

1 me earlier with the use of the distribution media?

2 A Yeah, it is. It's a nice way of saying we are
3 going to sell you something extra that just happens anyway.

4 Q The next line of that, the textured surface will
5 provide a mechanical lock between the tube and the filler
6 material, typically concrete.

7 Was this part of the standard language that
8 Hardcore used at the time to discuss its product in
9 those instances when it was offering concrete filler?

10 A Well, we weren't offering concrete filler. Again,
11 we were offering composite tube and, you know, needed to be
12 filled with concrete if you wanted to achieve higher levels
13 of like a certain level of performance.

14 The mechanical lock, some sort of lock between the
15 tube and the filler material is needed to keep the two
16 acting together. That was the testing that we have done and
17 we were involved with your client in a number of, you know,
18 head-to-head on some of these tests. And I know that your
19 client uses an expansive agent, which is different than a
20 non shrink agent.

21 So there needs to be some clarity there, too.
22 There is a very big difference in the concrete industry
23 between an expansive agent and a non shrink agent.

24 Q We'll talk about that in a minute.

25 A But, anyway, what you need to do is keep the

1 concrete in contact with the inside of the tube. If you can
2 picture -- if you start -- if you take a tube and fill it
3 with something. I don't have a good examples of something
4 like that. But if you picture if you start to bend it, if
5 they are not in intimate contact with each other in some
6 way, they are going to slip past each other as they try to
7 bend at some point.

8 So in order to achieve the levels of
9 performance that both ourselves and Lancaster needs to
10 get to be players in the industry, you need to somehow
11 keep the concrete and the composite in contact with each
12 other.

13 Q What about the phrase mechanical lock? Was that a
14 phrase that Hardcore Composites was using to describe the
15 connection between the filler material and the interior of
16 the tube?

17 A Yeah, it was. I mean it's not the -- the ways
18 that you could -- I mean the three ways that you could do
19 this would be a chemical lock, which would be somehow
20 coating the inside if it was feasible with like an epoxy
21 bonding agent before you put wet concrete into the tube so
22 that the tube and the concrete bonded to each other.

23 You can have friction, a friction lock, which
24 is achieved basically the way your client achieves it,
25 which is by pressing the concrete, by having the

1 concrete expand a little bit and not, you know, press
2 against, you know, press against the tube.

3 Or mechanically, which is by the rough surface.
4 It's just stuck in there and you can't get it past
5 itself.

6 Q Let's go back for a moment.

7 You were talking about a few moments ago some
8 testing. And I took it to mean some testing of the locking.
9 You said some testing, head-to-head testing between Hardcore
10 product and Lancaster Composite product?

11 A Yeah. You described it earlier. It was described
12 in this, up at the Lehigh University, the three point bend
13 testing.

14 Q Yes.

15 A And there was another -- there was a cold weather
16 lab test and there was a number of tests that these products
17 went through.

18 Q And is one of the areas that was tested the
19 connection between the concrete filler and the interior
20 surface of the tube?

21 A To my knowledge, the actual -- that actual
22 interface was never itself tested. It was more of a
23 de facto test when, if you can see the concrete slip past,
24 you know, bulge out the end of the tube. I know Hardcore, I
25 cannot speak for Lancaster, never did like some sort of test

1 where we made little coupons and bonded concrete to the
2 coupon and tried to test it that way.

3 Q Although you didn't test it specifically, are you
4 aware of the outcome of the testing, whether chemical lock,
5 a friction lock or mechanical lock, that one was better than
6 another when used in composite tubing in concrete?

7 A To the best of my knowledge, both the Hardcore
8 method of the rough surface and the Lancaster method of
9 pressing the concrete against the outside appeared to have
10 both been equally satisfactory, though there is no
11 quantitative numbers to be put to either one.

12 Q Fair enough.

13 Now, also, a few moments ago, you were talking
14 about the difference between, in the concrete area,
15 expansive agents and non shrink agents. Could you elaborate
16 a little bit on that and what at least you understand to be
17 the difference in the industry?

18 A Yeah. There is different chemical add mixtures
19 that can be put in concrete mix to both make the concrete
20 expansive and make it non shrink.

21 Q And from your perspective or your understanding in
22 the industry, those are two different types of agents?

23 A Yeah. Generally. And used for two different
24 purposes. I mean just the definition, just the outward
25 description of definition is -- kind of explains the way

1 they work. One would be that you put, pour some concrete,
2 wherever it is, and you add non shrink agent in it and it
3 doesn't -- because concrete shrinks as it cures and the
4 water comes out of it, it shrinks. That's where most of the
5 cracks when you see in your basement or floor or anything is
6 from shrinkage.

7 So there is add mixtures that are put in there
8 to help it stay like you poured it in the mold, in the
9 form, and stayed when it cured, it stayed where it was.

10 There is other agents that can be put in that
11 can actually like cause the concrete to actually change
12 its volume from what it started at to actually kind of
13 increase.

14 Q Is there a specific agent or are there a whole
15 host of agents that perform these functions?

16 A There is a whole host of agents. I mean the
17 company, SKW Americas that it was once and now Degussa was
18 an owner of Hardcore was -- is a major manufacturer of some
19 of those agents. And there is dozens of them.

20 Q Are there agents which accomplish one or the other
21 depending on how much material, how much of the additive you
22 put in?

23 A There are a few that I'm aware of that if you keep
24 adding enough of the non shrink, you can get it to go to
25 other directions and actually press out. That's something

1 in a composite situation that we would just never ever want
2 to see done.

3 Q And the reason for that?

4 A Well, one of the main failures of composites is
5 what's called a stress rupture.

6 Q Okay.

7 A Which is when you take a glass, it's a phenomenon
8 that's strictly related to glass composites as opposed to
9 carbon fiber or something else.

10 What happens is, if you load glass composites
11 to a certain level for an extended -- for a continuous
12 period of time without taking the load off of it, they
13 will at some point spontaneously just rupture.
14 Basically spontaneously fail.

15 So one of the big design parameters in
16 composite design, and it's the bridge decks, it's
17 anything, anything made out of fiberglass, that's using
18 glass fibers is making sure that you're holding the
19 continuous stress below a 20 percent level. And when I
20 say continuous stress, that's a stress that's imparted
21 into the part that's never ever taken off the part.
22 Such as like in a bridge deck. The dead load of the
23 structure, if you can picture the dead load is just its
24 own weight that it's supporting. You need to take that
25 into account that the dead load of that structure cannot

1 be more than 20 percent of its ultimate load or you may
2 experience the stress rupture situations. You need to
3 design for that.

4 The reason we would not put an expansive agent
5 in the pile is that since you don't really know how
6 much -- by how much, especially out in the field, if a
7 contractor was pouring concrete in, how much pressure he
8 put out, like by prestressing the tube by filling it
9 with expansive cement, if that stress is too big, it
10 ultimately over time may just cause the composite tube
11 to rupture.

12 This happened a lot. They tried to use
13 composite tubes to fix telephone poles and they had huge
14 failures in this because the telephone pole swelled up
15 because wood swells and the wood swelled up from when it
16 was wet and it pressed on these wraps that they put
17 around the telephone poles and they all started
18 splitting everywhere.

19 Q Going back a little while ago I was asking you, in
20 this instance, when a contractor or an end user was going to
21 be filling a composite tube that Hardcore had provided with
22 material, whether you provide any advice, guidance,
23 consulting information, anything like that. I want to go
24 back and revisit that question in terms of you just were
25 telling me about some concerns of what add mixtures you

1 might put into concrete.

2 Did you have that kind, that is you, Hardcore,
3 have that kind of dialogue with contractors or end users
4 when you knew that one of the things they were going to
5 be doing was filling your composite tube up with
6 material?

7 A Yeah. I think I was pretty clear when I just said
8 that no -- we never did that to the ones we filled at our
9 facility. And we did not put expansive agent in any or
10 allow an expansive agent to be put into anything that was
11 out in the field.

12 Q In any of the documents that you provided, do you
13 remember anything covering that or addressing that in terms
14 of what sort of expansive agents or what sort of add
15 mixtures could be put in the concrete as filler material,
16 any type of warning, literature, documents, anything?

17 A I know that we never like warned anybody not to do
18 it.

19 Q A few moments ago, you made the statement that we,
20 Hardcore Composite, never used certain type of add mixture.
21 And just so that I'm not making any mistake on the lingo
22 here. Did Hardcore ever use the anti shrink add mixture?

23 A No.

24 Q Did it ever use the expansive add mixture?

25 A No.

1 Q You mentioned that this textured inner surface
2 that we were talking about of the tube came as a result of
3 changing a little bit about the manufacturing process?

4 A Correct.

5 Q When did that occur?

6 A It started evolving -- I mean there was some
7 testing going on before I ever arrived.

8 Q In 1997?

9 A Yeah. But they had been playing with a number of
10 different ways of making the tubes. But we, under my
11 guidance, you know, because there was a number of people.
12 It wasn't me alone. There was a big staff. Headed towards
13 this --

14 Q What year would you identify as the year in which
15 the product coming from Hardcore, under whatever iteration
16 it is, had this textured inner surface because it was using
17 the other type of vacuum process?

18 A Well, the first iterations of it were back in
19 like -- I believe back in like as early as '93 they were
20 playing with it. And it was back and forth as to how to
21 make them, how to, you know, which was the way to do it, how
22 do you do it. They were playing with whether they had
23 acrylic on the outside, they didn't have acrylic on the
24 outside. But it was back probably as early as '92 to '93
25 that they were playing with the -- using the distribution

1 media on the inside.

2 Q But you identified a major project shortly after
3 you got to Hardcore DuPont, a bridge project, I think you
4 were describing for me?

5 A Correct.

6 Q Were you using, you, Hardcore DuPont, did it use
7 the distribution media to form the composite tubes for that
8 project?

9 A Yeah, we did use the distribution media to do
10 those as well as those piles, the picture you were -- it was
11 the other document. The pier end.

12 Q At any point after you joined Hardcore in 1997,
13 did Hardcore provide to an owner or to a contractor
14 composite tubes which did not incorporate the distribution
15 media?

16 A No, never.

17 Q Were you involved in any type of discussions or
18 did you ever look at or consider the lock, to the extent
19 that there was a lock, in the earlier iteration of the
20 tubing, that is before you started using distribution media?

21 A I don't know if I fully understand your question.

22 Q All right. Well, we have talked about the fact
23 that, as a result of using distribution media, we have a
24 textured inner surface which then had the secondary effect
25 of providing a mechanical lock if you put concrete in there.

1 My question is, did you ever consider, look at,
2 discuss, what type of lock might exist in the product
3 before you went to the distribution media?

4 A Not that I'm aware of or not that I can recall.

5 (Hemphill Deposition Exhibit No. 3 was marked
6 for identification.)

7 BY MR. WERNER:

8 Q I have had a document marked as Deposition Exhibit
9 No. 3, and ask you to just take a brief look at that, and
10 after you have had a chance, describe that document for me?

11 A Yeah. This is a brochure -- I don't even know if
12 it was a brochure. It was produced while we were part of
13 the Degussa, SKW time frame. I just know from the actual
14 document itself. And it's basically our pile repair jacket
15 and the seismic upgrade jackets that we had fabricated, or
16 sold and fabricated.

17 Q Were pile repair jackets a product that Hardcore
18 Composites continued to offer after the split from Degussa
19 after it was self-standing as Hardcore Composites, LLC?

20 A Yeah.

21 Q Can you describe for me the similarities, if any,
22 between the pile repair jacket and the composite tubes that
23 we have been talking about?

24 A I mean without sounding coy, other than they were
25 both made out of glass composite, they were pretty

1 different.

2 Q Was the VARTM process used in producing the pile
3 repair jackets?

4 A Yes.

5 Q I understand that certainly the use to which this
6 product was put was much different than the tubing. But in
7 terms of the manufacturing process, were there any different
8 materials that were used in creating the pile repair jacket
9 as opposed to a composite tube?

10 A The actual fabric that's used in these jackets, to
11 the best of my recollection, it's not the same orientation
12 that would be used for a pile.

13 Q What's different?

14 A There was just the amount of -- remember earlier I
15 described how much fibers went in each direction. The
16 amount of fibers going in each direction in these repair
17 jackets is different, a different recipe than what was in a
18 piling. Mostly due to the fact that the jackets are like
19 two halves. So where the two halves bond, because the pile
20 already existed and these jackets have to go on around an
21 existing piling. So where the bond between the two halves
22 has to be a lot stronger because it's not continuous, the
23 fibers aren't continuous going through that zone. So you
24 have to put a lot more fiber in the -- in that direction to
25 account for that.

1 Q Talking about fiber orientation. If we could go
2 to I think it's the fifth page. That is number five on the
3 bottom right-hand corner.

4 A Um-hmm.

5 Q This is discussing, if I understand correctly, the
6 fiber or orientation of the pile repair jackets?

7 A Yeah.

8 Q Could you tell me, just walk me through and tell
9 me what this document demonstrates or tells us about the
10 fiber orientations?

11 A Basically it's just -- I think just showing some
12 people in the general community what the different, like the
13 uni-directional composite and the type of fiber we would use
14 would be the WM4505, which is uni-directional, meaning all
15 fibers run in one direction.

16 Then there is like a multi-axis and then there is
17 a -- it's called an enhanced multi-axis meaning that it's
18 off balance. Multi-axis, where it says multi-axis means
19 that the fiber is balanced in each direction. Same amount
20 of fibers going in each direction. And then bidirectional,
21 it doesn't have any plus minus 45s in it.

22 And there is the fiber, there is a QM 64 weight
23 and I think that says QM 9100 and WR 2400.

24 Q So the WM or QM, QE, WR, they are different
25 products that were offered by Hardcore, different types of

1 pile repair jackets?

2 A No, that's just basically different fabric that's
3 in the jacket itself. That was just a designation of the
4 type of fabric that was in the jacket.

5 Q Did you have or did Hardcore have a document that
6 described or depicted the fiber orientation for the
7 composite tubing? We have here the fiber orientation
8 explanation for the pile repair jackets.

9 A Not that I'm aware of. It may have existed
10 somewhere. I'm not sure.

11 Q You were telling us earlier that there were some
12 differences. If we looked at this document prepared for the
13 composite tubing, would we see differences, if you were
14 doing, reporting on the same type of information for the
15 composite tubing?

16 A Yeah, you would see the composites, just as the
17 composite tubes were made with a lot of what would be the
18 QM, where it says 60, 9100, the second one from the end, the
19 multi-enhanced, enhanced multi-axis. If you'll notice that
20 says, the ultimate tensile strength, it says primary access.
21 Go all the way to left.

22 Q Yes.

23 A You see like 74,000 p.s.i. You can see how, as
24 you add, you start to take away fiber and start adding it
25 into the other directions, you may -- like the next one is